CHAPTER **10**

Current Concepts in Abscess Treatment

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INTRODUCTION

Abscess comes from the Latin abscessus, which means a going away or departure of tissues to allow room for the matter between them (1). Skin and deep tissue abscesses are a common occurrence in podiatric practice. In 2005, there were 3.4 million annual emergency department visits for skin and soft tissue infections (2). Visits for abscesses increased 3.1 fold from 1997 to 2007, whereas other skin and soft tissue infections (SSTIs) only increased minimally (3). Recent studies have also shown that with the rise of community-acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA), skin abscess is, in patients under 40 years old with no relevant past medical history, becoming more common (4). It is therefore imperative for the podiatric physician to have a solid understanding of current concepts in treatment of abscess.

PATHOGENESIS

Abscesses are soft tissue infections that contain a nidus of infection, which results in a buildup of purulence within the tissue of the body (5). *Staphylococcus aureus* is the most common causative organism of abscess and is responsible up to 78% of the time, CA-MRSA is responsible in 63% of cases (6). Polymorphonuclear leukocytes (neutrophils) are the body's primary cellular host defense against *S. aureus* infections, and are a major component in *S. aureus* abscesses (7). *Streptococcus pyogenes* is another common cause. In immunocompromised hosts, organisms such as *Pseudomonas aeruginosa,* beta-hemolytic streptococci, and *Enterococcus* may be seen (8). *Streptococcus pyogenes* causes monomicrobial necrotizing fasciitis, while polymicrobial necrotizing fasciitis is caused by a mix of aerobes such as staphylococci, streptococci, and anaerobes such as *Peptostreptococcus, Bacteroides,* or *Clostridium* (9). Parasites such as *Dracunculiasis* and *Myiasis* are rarely involved and are more commonly seen in the developing world (10).

ETIOLOGY

Risk factors for cutaneous abscess include bacterial overgrowth, antecedent trauma, foreign body, immunosuppression, and impaired circulation. Abscesses are common among intravenous drug users, with rates reported as high as 65% (11) and require special consideration due to increased likelihood of retained foreign body (broken needles), tetanus, and endocarditis (12).

DIAGNOSIS

The diagnosis of skin abscess is often straightforward and made by physical examination and confirmed upon incision and drainage (5). Deeper abscesses may be more difficult to diagnose, however, and according to one study have only fair interobserver reliability, which is unrelated to physician experience (13). Signs and symptoms of abscesses include erythema, edema, warmth, pain to palpation, and fluctuance (5). Differential diagnoses include empyemas, which are accumulations of purulence in a preexisting cavity, cellulitis, sebaceous cysts, and necrotizing fasciitis (10). Erythema often extends beyond the abscess itself. Abscesses are often accompanied by cellulitis, and may be seen in association with necrotizing fasciitis and/or gas gangrene.

Plain film radiographs should be obtained and examined for soft tissue emphysema and/or osseous involvement. Radiographs can also be useful in identifying retained foreign bodies, especially in patients with a history of intravenous drug use (12). Ultrasonography improves diagnostic accuracy and in one study, resulted in a change of projected management in 56% of patients, and 80% of these patients who underwent additional diagnostic testing had purulence or fluid collections (14). In the same study, treatment plans were altered in 75% of abscesses of which drainage was thought to be necessary (14). Computed tomography or magnetic resonance imaging (MRI) are also useful modalities in diagnosing abscess, but are only necessary in complicated cases as most instances of abscess can be diagnosed clinically. Needle aspiration for diagnosis can confirm the suspicion of abscess with expressed purulence, however the absence of purulence on needle aspiration does not rule out the presence of an abscess (15).

TREATMENT

The Infectious Disease Society of America has developed a useful algorithm in empiric management of SSTIs (16). The mainstay of treatment is incision and drainage (17). Incision and drainage technique should include a single incision along relaxed skin tension lines long enough to ensure complete drainage and allow drainage of loculations with a blunt instrument, and deep enough to fully drain the abscess cavity (5). According to one study, most abscesses can be adequately drained through a 1 cm incision (18). Needle aspiration, or attempt at needle drainage is inadequate and should be avoided (5). One randomized

trial with 101 patients showed that ultrasound-guided needle aspiration versus incision and drainage resulted in ultrasound-documented complete drainage and symptom resolution by day 7 in 26% versus 80% of patients (19). Patients with a history of intravenous drug use who have a fever should be hospitalized and worked up for possible endocarditis and/or vascular complications (12).

There has been some controversy in the literature about whether drainage alone is sufficient for treatment of abscess, or whether this needs to be supplemented with antibiotics. Before empiric antibiotic therapy is initiated, abscess cultures and sensitivities should be obtained to enable targeted antibiotic selection upon culture results. Cure rates for drainage alone are about 85% (20), and most studies have not shown a significant difference in cure rates with or without use of antibiotics in combination with drainage (20,21). However, a recent multicenter, prospective, randomized, double blinded, placebo-controlled trial showed significantly different cure rates of 83.1% and 81.7% for incision and drainage combined with clindamycin and trimethoprim-sulfamethoxazole (TMP-SMX) respectively, versus only a 68.9% cure rate with incision and drainage alone (22).

In the study, which was conducted between 2009 and 2015, patients with a single skin abscess of less than 5 cm in diameter underwent incision and drainage, and were assigned to either the TMP-SMX, clindamycin, or placebo group (22). Patients were selected if they had at least 2 of the 4 following signs or symptoms: erythema, swelling or induration, local warmth, purulent drainage, or tenderness to palpation (22). Treatment-associated adverse events were higher in the clindamycin group (21.9%) than in the TMP-SMX group (11.1%), with the most common adverse events being diarrhea and nausea (22). Most adverse events were mild or moderate with no episodes of *Clostridium difficile*-associated diarrhea noted (22) The results of this study call into question the general perception, (which is largely based on smaller, underpowered trials or expert opinion), that cure rates do not improve with the addition of systemic antibiotic treatment to incision and drainage (22). The study is limited by the short follow-up time of 1 month, and in that only 2 antibiotic agents were tested (22).

The Infectious Disease Society of America recommends systemic antibiotic treatment in addition to incision and drainage for the following patients: severe or extensive disease, rapid disease progression, associated cellulitis, systemic signs and symptoms of illness, coexisting conditions or immunosuppression, very young or advanced age, abscess in a difficult to drain area, or abscess that does not respond to incision and drainage alone (23). The Infectious Disease Society of America has created an algorithm for management of SSTIs, including abscess, with recommendations for empiric antibiotic treatment (Figure 1) (16). Due to increased incidence of *Streptococcus pyogenes* in non-fluctuant lesions, which are difficult to differentiate from cellulitis, clindamycin or TMP-SMX plus cephalexin are recommended empiric regimens for these lesions (16).

POSTOPERATIVE CARE

After incision and drainage, the abscess should be left open, with some evidence supporting gauze packing (8). Primary closure is generally avoided due to fear of retained infection, however, evidence shows that primary closure after adequate drainage may result in faster healing times without increased risk of abscess recurrence (24). Patients should be closely followed on an inpatient or outpatient basis depending on abscess severity and presence or absence of systemic signs of infection or sepsis.

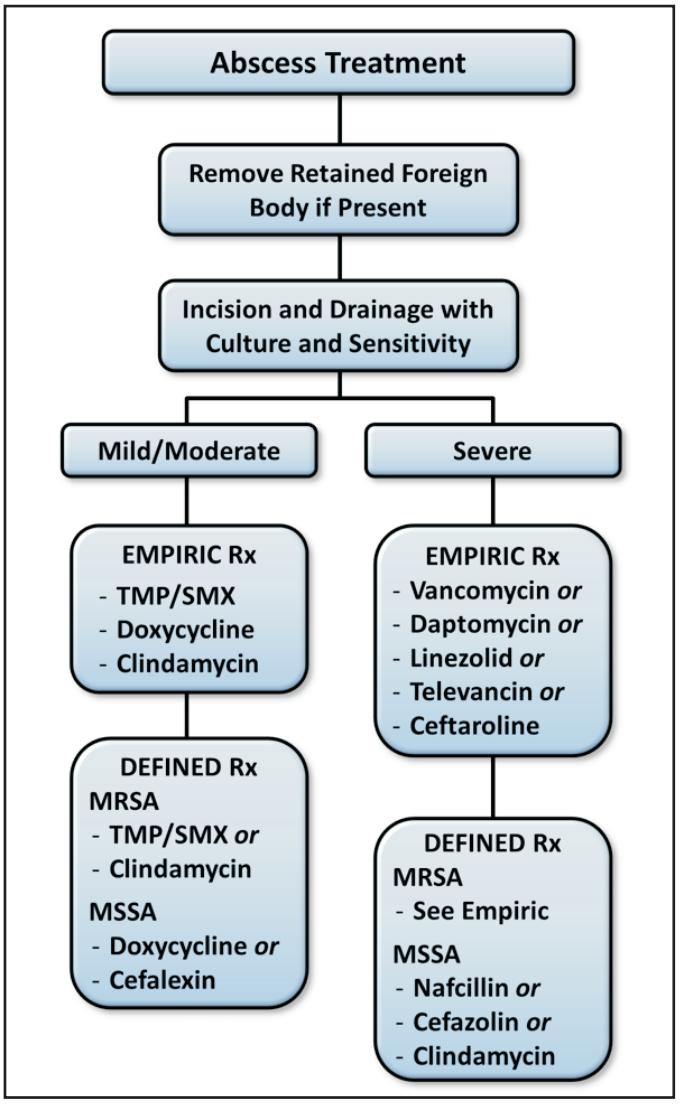

Figure 1. Algorithm for management of skin and soft tissue infections. Adapted from the Infectious Disease Society of America.

COMPLICATIONS

Even without drainage, simple abscesses will rarely lead to sepsis or death as they tend to eventually break through the skin and drain (10). However, when complicated with MRSA, osteomyelitis, gas gangrene, or necrotizing fasciitis, the infection becomes more serious and can lead to increased morbidity and mortality. Diarrhea is a common adverse event in patients who are treated with antibiotics in addition to incision and drainage and this may or may not be related to *Clostridium difficile* (22).

The occurrence of abscess is common and will often be seen in podiatric practice. Proper identification and appropriate treatment of abscess leads to higher cure rates and decreased morbidity and mortality. Incision and drainage is the mainstay of treatment, and it has been shown that systemic antibiotic treatment improves cure rates. Due to the high prevalence of MRSA as the causative agent for abscess, TMP-SMX or clindamycin are appropriate first line agents. Abscess cultures should be obtained upon drainage and before the use of systemic antibiotics to further guide antibiotic treatment.

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